Geophysical Research Abstracts
Vol. 15, EGU2013-12785, 2013
EGU General Assembly 2013

Estimating the Earth's gravity field using a multi-satellite SLR solution

Mathis Bloßfeld, Vojtech Stefka, Horst Müller, and Michael Gerstl
Deutsches Geodätisches Forschungsinstitut (DGFI), Munich, Germany (blossfeld@dgfi.badw.de, +49 89 23031 1240)

Satellite Laser Ranging (SLR) is the unique technique to determine station coordinates, Earth Orientation Parameter (EOP) and Stokes coefficients of the Earth's gravity field in one common adjustment. These parameters form the so called "three pillars" (Plag & Pearlman, 2009) of the Global Geodetic Observing System (GGOS). In its function as official analysis center of the International Laser Ranging Service (ILRS), DGFI is developing and maintaining software to process SLR observations called "DGFI Orbit and Geodetic parameter estimation Software" (DOGS). The software is used to analyze SLR observations and to compute multi-satellite solutions.
To take benefit of different orbit performances (e.g. inclination and altitude), a solution using ten different spherical satellites (ETALON1/2, LAGEOS1/2, STELLA, STARLETTE, AJISAI, LARETS, LARES, BLITS) covering 12 years of observations is computed. The satellites are relatively weighted using a variance component estimation (VCE). The obtained weights are analyzed w.r.t. the potential of the satellite to monitor changes in the Earths geometry, rotation and gravity field. The estimated parameters (station coordinates and EOP) are validated w.r.t. official time series of the IERS. The obtained Stokes coefficients are compared to recent gravity field solutions and discussed in detail.